Space Weather Forecast

Issued on Tuesday, 04 October 2022 at 01:28 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

---

Space Weather Forecast Headline: G1/Minor storms possible, mainly Day 1. Ongoing likelihood of Moderate flares with chance of isolated Strong flares due to two notable sunspot groups.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity has been Moderate in the past 24 hours, with multiple lower-end Moderate flares from the two most active regions in the northeast and northwest. There are seven numbered regions on the visible disc, with a region in the northwest and a large complex region in the northeast the most likely source of any further flares. The other regions are small and simple.

In the last 24 hours, two CMEs were observed directed to the northwest following moderate flares from the active region in the northwest during the 3rd. The first of these was modelled and is a clear miss ahead of Earths orbit.The second followed a near identical trajectory and was narrower, and is also assessed as being well off the Sun-Earth line. Another CME from a filament eruption in the southeast late on the 2nd has now been analysed, and has a very slight chance of glancing Earth day 3 (6th). However, this is low confidence, and any significant impacts are considered very unlikely.

Solar Wind / Geomagnetic Activity: Solar wind speeds have been at slightly-elevated to elevated levels due to Earth being affected by faster winds from a coronal hole. The magnetic field strength was mostly weak but climbed to moderate for a time in the second half of the UTC day. The important north-south component showed two periods of moderate strength southward direction between midday UTC and 03/1930 UTC. The resultant geomagnetic activity was mainly Quiet to Active (Kp 1-4), but with a G1/Minor Storm (Kp 5) interval 03/1800-2100 UTC.

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is currently just above normal background levels and easing in response to the recent Strong flare, but well below the S1/Minor Storm threshold.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is forecast to be Moderate, with a chance of High levels, due to likely further flares from the large region in the northeast and the region in the northwest.

Solar Wind / Geomagnetic Activity: There are potentially several CMEs which could influence Earth, all from near the sunspot group in the northwest. The most likely of which left the Sun on the 1st, could potentially arrive early on day 1 (4th), although this is low confidence with a glancing impact most likely. The uncertainty around these CMEs gives very low confidence in the forecast. Otherwise current elevated to slightly elevated winds are expected to only gradually ease by the end of the period. Geomagnetic activity is forecast to be mainly Unsettled to Active day 1 (4th) with a chance of further G1/Minor Storms, especially with any CME influences.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Otherwise, a general trend back towards Quiet to Unsettled is likely through the period.

Energetic Particles / Solar Radiation: The count rate of energetic particles is expected to be near or at background but with a chance of rising at times due to any further flaring from the notable sunspots. This giving a slight chance of exceeding the S1/Minor Storm threshold.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	Yes	60	20	5	5
Strong	G3	No	15	1	1	1
Severe	G4	No	2	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares Probability	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	R1-R2 M Class	Yes	80	80	70	70
Very Active	R3 to R5 X	No	30	30	25	25

Solar Radiation Storms - (High Energy Protons):

Radiation Storms Probability (Exceedance)	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Active	≥ S1	No	20	20	15	15
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.

Issued by Met Office Space Weather Advisor, Tel: +44 (0) 330 135 4254 Email: moswoc@metoffice.gov.uk

© Crown Copyright 2022. All Rights Reserved.